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ABSTRACT

This study examined the relationship between computer-mediated communication (CMC) and school culture, in order to provide a better understanding of what will be needed if the promise of technology in educational reform is to be realized. Online interviews conducted as a series of electronic mail exchanges were the primary means of investigation. The sample consisted of 25 educators representing schools in 16 states and six countries. Analysis of the interviews led to the construction of themes that represent the ideas, beliefs and practices of the study participants. These include access, a concern for the availability of technology, and its ease of use. Themes concerned with school culture are climate, the atmosphere in which the use of CMC transpires, the role of the school administration, and the effect that the implementation of CMC in the school has upon its subsequent use. It was concluded that aspects of a positive school culture include trust and collaboration among the professional staff, a commitment to professional development, and a respect for students as individual learners and administrative encouragement and support. Together, these factors help make the difficult transition to CMC easier. Contains 18 references. (AEF)

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Organizational Culture and the Classroom Integration of Computer-Mediated Communications

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Two themes currently receiving considerable attention in discussions of education are technology and reform. Studies are linking the two, some of them with great hope for the future (Sandholtz et al. 1997), and others with a somewhat more concerned view (Means, 1994). The impact of online technology, when used as computer-mediated communication (CMC), on schools will stimulate changes in teaching practice, and in student learning (Heflich, 1996). However, it is well known that schools are social organizations with identifiable and distinct cultures (Sarason, 1991). Cultural change is problematic, depending in large part on factors that are neither fixed, nor linear (Fullan, 1993). This study attempts to clarify the relationship between CMC and school culture, hopefully leading to a better understanding of what will be needed if the promise of technology in educational reform is to be realized.

CMC in education

The presence of CMC in schools is growing rapidly. According to Heaviside, (1996) half of all public schools currently have access to the Internet, and 74% of those not currently connected plan to do so in the future. Even so, only 9% of all instructional rooms now have direct access to the Internet. Among all U.S. public schools, 85% have access to some sort of local or wide area computer network. Public schools have an average 72 computers, however only 14% of all computers in schools have direct access to computer networks (Heaviside, 1996).

Great claims have been made on behalf of the benefits of CMC for teaching and learning. Wilson (1995) reports strong positive effects for the use of technology in the classroom and its impact on teaching methods, teacher attitudes, student achievement, and student attitudes. Students participating in CMC-based learning circles dedicated to student writing demonstrated significant gains in writing ability (Riel, 1994). A 1995 Office of Technology Assessment (OTA) study distinguishes between teacher-centered instruction and student-centered instruction. Teacher-centered instructors tend to use computer technology in a didactic manner, emphasizing its use to reinforce skills with drill and practice software. Student-centered instructors use computer technology in a more collaborative fashion and are more enthusiastic about its use because it supports their style of teaching (U.S. Congress, Office of Technology Assessment, 1995).

The changing role of teachers that emerges from the use of CMC is reiterated in the literature on teacher education and professional development. Teacher education and ongoing professional development opportunities are now being offered online (Schrum, 1992). The use of online computer conferencing has been used to affect the moral development of preservice teachers by providing them with a venue for reflective discussion (Harrington, 1992). CMC expands teachers' boundaries, allowing them contact with colleagues, school offices, experts in various fields, and parents (U.S. Congress, Office of Technology Assessment, 1995). Direct connections that teachers make through the use of CMC help overcome the barriers to professional growth that are the byproducts of teaching in isolation (Riel, 1993).

Technology and school culture: The problem of change

Changes in teaching and learning have been subsumed into the general topic of school restructuring. In order for restructuring to succeed, it must address the core cultural relationship between the teacher and the student (Fullan, 1993). Implicit is the idea that schools in much of the country are structurally aligned in ways that inhibit change. The use of time, the requirements of state mandated curricula, and the nature of assessment limit the ability of technology to effect changes in teaching.

Cuban (1986) argues that computers, like other machines before them, are used by teachers in ways that supplement, rather than change, their practice. The fact that the environment limits changes in teacher practice is particularly true when considering the use of technology. Computer technology although relatively inexpensive, is a major investment for schools. Many districts have inadequate access to computers, modems and even telephone lines (Honey & McMillan, 1994). School districts operate

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in a public arena with different priorities for making decisions about how to use technology. The changes in teaching practice envisioned by many as a by-product of CMC are limited by the institutional and social barriers to change in many schools and districts (Winn & Coleman, 1989).

Barriers to the full adoption of CMC are a significant topic in recent studies. Heaviside (1996) summarizes the problem as a lack of funding and inadequate access to online resources. The OTA report (1995) is more specific. Although schools are investing heavily in hardware and software, they are not exhibiting the same concern with how technology will be used. There is a lack of adequate training for teachers. Furthermore, there is a lack of on-site technical and curricular support for teachers in the use of technology in the classroom. Access is an issue as well. Most online computers are located in offices or laboratories. Teachers need to make special, often difficult arrangements for their classes to use the machines. Finally, the age of computers in schools limits their ability to be of much use in the curriculum. Although the U.S. leads the world in the number of computers in schools, it falls behind in the number of modern computers available (U. S. Congress, Office of Technology Assessment, 1995).

Introducing any educational innovation is a process that needs to confront the culture of school (Sarason, 1991). Fullan (1993) has aptly described the process of educational change as a voyage that is non-linear and full of problems. Educational change will only succeed if the relationship between the teacher and the learner is at the forefront. Fullan (1993) has argued that change needs to involve the effort and support of both teachers and administrators in order to succeed. Furthermore, teachers must recognize and understand the benefits that will accrue to them if they are to abandon their tried and true educational practices for new ones (Sandholtz, 1997). The OTA report (1995) advises school districts to invest as heavily in human resources as it does in hardware and software. It advocates a technology plan in which training and support occupy one third of the technology budget.

Summary

Although the real and potential benefits for the classroom use of CMC are evident, it's adoption by schools is limited (Heaviside, 1996). One apparent reason for the discrepancy between use and benefit is the fact that CMC is relatively new. In many cases, the discrepancy is a factor of the culture of school and the difficulty of change. A number of studies (Heaviside, 1996; U. S. Congress, Office of Technology Assessment, 1995; Honey & McMillan, 1994; Wilson, 1995) identify funding, access, human resource development, and the implementation process as barriers to change. Fullan (1993) argues that all of these can better be subsumed into the core concept of school culture.

Method

Online interviews conducted as a series of electronic mail exchanges were the primary means of investigation in this study. The asynchronous nature of network communications lends itself to worldwide discourse. Practitioners with access to CMC have the ability to exchange ideas and information almost anywhere in the world.

Sampling was conducted by posting notices on a number of discussion groups concerned with education. The sample was composed of twenty-five educators representing schools in 16 states and 6 countries. Some schools have already adopted CMC, and are experimenting with its use; and others are in the process of adopting CMC. Fifteen of the schools are elementary; ten are secondary or K-12 schools.

An interview protocol was developed for use in e-mail exchange. It allowed for in-depth exploration of the implementation and integration of CMC into the curriculum. It included questions concerning the subject's teaching practice and the support CMC receives from other members of the school community. Recognition that each school's experience with CMC is unique favored the use of an unstructured interview rather than an online survey.

Data analysis was conducted according to the guidelines of the Constant Comparative Method (CCM), first described by Glaser and Strauss (1967). The goal of CCM is the emergence of theory from data, derived through repeated review of the data, each time examining it in order to locate common thematic content.

Interpretive validity of the data (Altheide & Johnson, 1994), was established by visiting a number of the sites to develop a visual sense of the school, the people, and the work being done there, and by having subjects review the interview transcripts to determine if they were being correctly represented. The review of transcripts was completed via electronic mail.

Results

Analysis of the interviews led to the construction of themes that represent the ideas, beliefs and practices of the study participants. They include access, a concern for the availability of technology and its ease of use. Themes concerned with school culture are climate, the atmosphere in which the use of CMC transpires, the role of the school administration, and the effect that the implementation of CMC in the school has upon its subsequent use.

Access

The availability of technology in a school has typically been the measure of its use (U.S. Congress, Office of Technology Assessment, 1995). However, the availability of online technology alone does not determine the use to which it is put. A new, broader concept of access is used to distinguish between those schools in which CMC is used effectively, and those in which it is not. Access encom-

passes not only the availability of computers, but also their location and type, the presence of modems and phone lines, as well as any limitations placed on student and teacher use. As such, it addresses a more significant distinction that divides the schools in this sample: the ease with which teachers and students can use CMC.

The schools represented in this study differ in the manner and extent to which CMC pervades the school. High access schools are those in which the use of online computer technology is fully integrated into the curriculum. Local area networks (LAN), with stations in each classroom, offer direct in-school communications capability and access to electronic mail and the World Wide Web (WWW). Teachers in high access schools use online resources with their students. Students have the ability to use CMC and the space needed to work on projects , which originate online. All of this takes place within a school culture that encourages and supports the use of CMC. Low access schools are not connected by a LAN and CMC is available from a single site, which teachers need to schedule in advance. Use of the accessible site may be limited to a few hours a week, or have other limitations such as the absence of good workspace. Student access to CMC is restricted in these schools. A culture of support for the use of online computer resources in the classroom is missing.

The underlying question concerning the classroom-based, curricular use of online computer technology is one of change. The process of change begins with a decision to invest in online technology, leads to the ongoing process of planning, purchasing and installing new equipment, proceeds to training and staff development for the professional staff, and culminates in ongoing technical and curricular support for the use of CMC in the classroom. The most highly accessible schools represented in this study approximate this process. Most others are somewhere in the process, with the least accessible schools just beginning the administrative decision-making process.

Climate

A positive school climate is one in which interactions among students, teachers, parents, and administrators are supportive and challenging. Some subjects speak of the respect that underlies all interactions, the level of collaboration and communication among school staff, and the importance of student involvement in their own learning.

Administrators in schools with a positive climate take staff wants and desires into consideration when developing the school schedule or otherwise organizing school activities.

The climate is one in which teachers work together and enjoy spending time with one another, enabling learning to be viewed as something in which individuals become more personally involved.

In contrast, a negative school climate is described as being devoid of support and collaboration. Teachers speak of being isolated from their peers, and lacking coordination and support. Teachers perceive their students as intellectually lazy and the cause of disciplinary problems. Because completion of the curriculum is paramount, innovations are met with suspicion. Although administrators talk of support, they offer little.

Another aspect of climate is the role of parents as part of the larger school community. Most high access schools have an active group of parents, who participate in PTA, serve on school committees, and participate in fund raising activities.

School climate is a significant factor affecting the success of CMC in schools. Schools with a positive climate are characterized as a place where thought is given to the way adults interact with students, and with each other. In contrast, negative school climates are places where relationships among administrators, teachers and students are obstacles to be overcome.

Administration

The attitudes, ideas and leadership styles of building and district administrators affect school culture by the level and type of communication they engender, as well as the support felt by individuals. The administrator is a significant actor in all aspects of the process of implementing CMC into the classroom. His/her leadership and active support of the technology plan may make a difference between success and failure.

The importance of the principal in teacher adaptation to the use of technology in the classroom is evident. Effective administrators provide a level of professional leadership that empowers their staff. Good administrators are supportive and flexible, accommodating the needs of their teachers in a number of ways. Administrators can devote the resources needed to replicate successful programs in schools throughout the district. They can develop and support partnerships between schools and universities or corporations to stimulate the use of online computer technology in the classroom.

School administrators are significant in the culture of an individual school. Their leadership and active support of the use of CMC can ensure that it will be uniformly accessible to teachers and students. A lack of administrative leadership and support becomes a barrier to school change that is difficult to overcome. It limits professional growth by teachers and reinforces a hierarchical structure of school.

Implementation

Few things foreshadow the success of CMC in the classroom quite as much as the implementation process. Implementation is a complex phenomenon that includes planning and decision-making. It encompasses not only the structural elements of wiring and equipment, but also the socio-cultural elements that support teacher adaptation to change.

The decision to bring CMC into a school typically involves planning by a committee that makes recommendations to the staff and principal. Sometimes the committee has help from an outside agent such as a university or corporation, which can help with finances, equipment and technical assistance. Successful planning efforts become part of the school culture, often stimulated by the district office or the principal.

When planning focuses on equipment and software, the element of professional development may be neglected. The effective use of CMC as a vehicle for enacting the curriculum depends on the adaptation of teachers to the use of technology in the classroom. Teacher appropriation of classroom technology is the result of the individual's ability to change, not simply the act of placing computer technology in the classroom. The OTA Study (1995) finds that extensive staff development is a necessary prerequisite for teachers' successful adaptation to computer technology.

Subjects working in schools which have a high degree of access are uniformly part of a culture in which training and professional development are the norm.

Some low access schools severely limit the amount of time teachers have for learning about technology, or adapting it to classroom use. Money for new equipment or training is difficult to find. School district leadership is not supportive, or even anti-technology, and has a difficult time conceptualizing change.

Those who advocate for CMC in low access schools often have to confront teachers' fears about changes that may result from its introduction into the school.

The implementation process can significantly affect the rate and quality of the adaptation of the staff to the use of online computer technology in the classroom. Planning and decision-making can help build staff interest in the use of online computer technology in the schools. Finally, the staff's adaptation to the use of CMC and their comfort with the medium is enhanced by an ongoing culture of staff development that focuses on teachers' use of CMC in a curricular context.

Conclusion: The Relationship of Culture to Access

A positive school culture allows a high degree of access to CMC to develop. The aspects of a positive school culture include trust and collaboration among the professional staff, a commitment to professional development, and a respect for students as individual learners and administrative encouragement and support. Together, these factors help make the difficult transition to CMC easier. They also allow the spirit of experimentation and exploration, so necessary for successful online teaching and learning, to develop.

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